TECHNIQUES OF COMMUNITY ENERGY CONSERVATION

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INTRODUCTION

Canada has the highest energy use per capita of any country in the world. We are also among the highest energy wasters in the world. However, while consumers ultimately foot the bill for this waste through the costs of products and services they buy and through taxes, they only have direct individual control over a small portion of energy of energy use. Consumers can turn down their thermostats, but only if they pay for their own heat; they can drive more slowly but only if they own a car; they can insulate their home but only if they own one, and can obtain credit. There are many energy wasting practices which consumers have very little control over such as landfilling of valuable urban wastes, getting their rented home properly insulated, getting to work without a car, and encouraging large energy users to cut back on their energy consumption. This report concentrates on the techniques whereby consumers can organize within their communities to reduce energy waste which individually they have no control over, but which ultimately they are called on to pay for.

Individual action to conserve energy can only go so far. There are many energy uses in society which can only be reduced by collective or community action. This applies to reducing direct energy use (e.g., formation of car pools) and to reducing indirect energy use (e.g., solid waste disposal). Community energy conservation techniques require that a community framework organization exists through which collective control over energy uses can be achieved. Individual energy conservation in the home or car requires that the owner have control over thermostat setting, house insulating, speed of driving, etc. Similarly, community energy conservation requires that the community or its representatives or some group of residents have control over collective transit, utility rate structures, solid waste disposal, etc. A prerequisite to both individual and community energy conservation is an adequate information and education service on energy and energy issues, and a means to fully discuss energy alternatives in the community.

use energy at a higher rate per capita. They also are in a worse position financially to obtain the necessary credit to cut their individual energy use. The disadvantages of low fixed income consumers can be summarized as follows:

- price increases bear more heavily.
- low quality accommodations require more upgrading.
- cash flow problems and high initial investment deter use of durable products.
- older cars used only for work and poor public transportation give reduced mobility, less choice, and high transportation costs.
- combined rent and energy costs gives no incentive for landlords to conserve energy.
- inequitable utility energy rates penalise small users.
- credit is difficult to obtain/there is a net money flow out of low-income communities.

Low and fixed income people and non-home owners therefore have two main needs which can be met by community organized energy conservation techniques:

(1) collective action to finance and organize improvements which will cut down individual energy use and costs; and

(2) collective action to bring about a more equitable energy production and distribution system where those who use the most energy pay both financially and socially for their actions.

This report is divided into three sections. The first section (A) deals with the techniques by which any group of people, acting collectively, can conserve energy over and above the energy they can conserve as individuals. This uses the most general definition of "community" and can apply to a small co-op or a whole city. The techniques are grouped according to type of community activity, starting with direct energy saving techniques such as housing and transportation changes,

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CHANGES IN HOUSING

Community or collective actions that have been used to reduce energy use in housing may be divided into two types:

- action that enables residents to lose less heat;
- action which ensures that residents can make the most of their heating systems or natural heating potential.

Actions of the first type include arranging for heat loss surveys, bulk purchasing of insulation, making representations on required housing improvements to landlords and municipalities, arranging for group contracts to carry out housing improvements, and making insulation and other products from local resources.

Actions of the second type include arranging for furnace efficiency tests, learning furnace maintenance, ensuring that the natural solar heating potential of buildings is not obstructed, and manufacturing solar hot water heaters and wood stoves.

Most of these actions require that residents be already well organized into a residents', tenants' or community association, and that the group has some experience in working together. Energy conservation leads to immediate cash savings in addition to more local self-reliance so that it is a useful element of community development. In less well organized residential areas care must be taken not to see energy conservation as an independent objective. It is important to introduce it as an element of a wider community plan, and it is also important to choose the right type of organization, one which will have the resources, and time to meet the expectations generated.

The extensive range of energy conservation techniques described above is most easily carried out in new or existing cooperative housing. In this case the residents are directly involved in the building of the housing and the heating system or they have a housing organization which is well suited to arrange for heat loss or furnace surveys, bulk buying, group representation to government, etc. Existing condominiums run a close second, having common heating systems in many cases and having some form of organization for running the condominium. New condominiums and single family units are still being built for the most

- through walls, ceilings and basements which are not adequately insulated;
- because of structural defects such as broken roofs, porches and siding;
- because of wasteful personal habits of the occupants in the use of hot water and space heating and in leaving doors and windows open, etc.

If a unit is heated from a central heating system shared with other units, then both the structural condition and the personal activities in these other units will affect the heating bill of the unit in question.

A proper heat loss survey should take all these losses into account and suggest what action should be taken to reduce the losses. The following are several examples of heat loss surveys which attempt to do this.

In Redhead, a suburb of Saint John, New Brunswick, a cooperative housing subdivision is investigating the possibility of using infrared photography to determine any heat losses in their relatively well insulated homes. The subdivision is also conducting a family scale analysis of energy use in each unit to reduce the average energy consumption. Longer term plans include the investigation of using a large wind generator to supplement electricity for water and space heating.[1]

A Durham, North Carolina, U.S.A. tenants' organization recently carried out a heat loss study to gather data so that they could convince city officials to change the local building code that would give an incentive for landlords to put storm windows and doors on their property. With the help of the North Carolina Public Interest Research Group, they obtained the necessary formulae to estimate heat losses with or without storm windows and doors and thus calculate the savings. Working through the meetings of the tenants' association, six typical homes were chosen, representing a spectrum of rental situation (houses and

1. New Brunswick Community Planning Association, Personal Communication, March, 1977.

insulation and how much savings will result. As a demonstration of the program, Project-Enersave was launched in two Newfoundland cities, St. John's and Corner Brook. Several people were employed to visit each owner occupied house. During the door to door survey, each homeowner was asked to complete a questionnaire giving the necessary structural details of their house. After computation of the results, they were mailed back to the homeowner. The service was publicized widely through local organizations and events such as service clubs, hockey games, etc. As a comparison with door to door visits, questionnaires are also being mailed directly to residents of rural areas.[5] There seem to be a few drawbacks with the mailed questionnaire approach, partly due to its similarity to a census form. It does not fully explain the purpose of obtaining the information or how heat losses occur and how they are calculated. This is further aggravated by having to send the forms to Ottawa. Another problem with the Enersave system is the assumption that housing structures are sound. This could be misleading for people living in poor quality housing - the results could indicate that insulation is necessary when in fact the roof has a hole in it.

A survey of 12 cooperative households in Minneapolis, Minnesota, showed that, on a per capita basis, residents used 40% less natural gas for heating, 82% less electricity and 6% less gasoline than the member of an average American household.[6] Demonstrating this concept of lower energy consumption through a modified lifestyle, the Farallones Institute in Berkeley, California, has shown how people can quite simply do more with less through conscious changes in home technology and personal habits.[7]

A community Conference entitled Homes and Energy was organized on October 30, 1976 in Davenport, Toronto by the local M.P. Charles Caccia.

5. Project Enersave, Office of Energy Conservation, Department of Energy Mines and Resources, Ottawa.

6. Carr and McLeod, "Getting it Together" Environment, November 1972, p. 2.

7. Philip Willman, "The Consumers' Choice" Energy Conservation Training Manual, the Conservation Foundation, p. V-29.

In Durham, North Carolina, the tenants' association who had estimated that they could save $30 - $80 annually through installation of storm doors and windows, made a representation to the city to amend the local housing code which would require storm windows on all residences unless the owner was under a heavy financial burden.[8]

The State of Montana has decreed that all home modifications which conserve energy shall be exempted from an increase in property tax.[9]

In Davis, California, the City Energy Committee has drawn up a new ordinance controlling building design elements such as amount of window area and insulation.[10]

Recommendations

(i) - community organizations should make representation to local municipalities to enact the following:

* exempt all building improvements which reduce heat losses from property tax
* produce a local housing code which requires basic insulation, weatherstripping and storm windows to be installed on all housing
* bring in a property tax incentive which would reduce the tax on well insulated rented units

3. Keeping the Heat In

Once the points of greatest heat loss have been located and the push for local incentives have been initiated, there is the question of making the necessary changes to housing. All of the following options are open to a well organized housing organization:

- procuring insulation and other materials
  - purchasing in bulk
  - making them from local materials
- instalation of insulation, etc.
  - self help
  - using local trained personnel
- financing
  - banks
  - local credit unions
  - cooperation with landlord

8. Ken Bossong loc. cit.
9. People & Energy, August 1976, p. 10.
10. People & Energy, November 1976, p. 5.

(ii) - tenants with long term leases who pay their own heat could follow a similar procedure for small modifications like insulation and weatherstripping. The cost of the changes could be recouped before the lease term was up. Landlords are unlikely to complain because if carried out correctly, it would increase the property value.

(iii) - tenants with short leases or whose heat is included in the rent should try to arrange a deal with the landlord where the landlord pays for the cost of renovations and the resulting savings are split - the tenants having a lower rent - the landlord a higher income to cover the long term loan for renovations.

(iv) - the best community approach to both heat loss survey and house improvement would be to use all or some of the following:

* arrange for the training of volunteer members of the residents' or tenants' association or group such as senior citizens and young people so that they can carry out heat loss surveys for all residents. Local community colleges should be able to carry out this training.
* arrange for bulk purchase of insulation, wheather-stripping, and other materials through the association.
* incorporate a non-profit or cooperative insulating and home renovation group that could carry out both the survey and the necessary home modifications. This could also provide jobs and training in the community. The group could also investigate the possibility of making loose fill cellulose fibre insulation from recycled newsprint.

(There are several models for this type of incorporation; for example, a cooperative with share capital which hires and trains people, a worker-owned and run corporation, or in larger cases, an association or community owned non-profit corporation where members of the community serve in rotation on the board of directors (jury style).)

to a licence to maintain furnaces. Enrolment by homeowners in the second course has been greater than the first indicating a real distrust of present maintenance arrangements and a desire to have some control over the situation.

Many Canadians living in rural and some urban areas have access to wood for burning, but do not realize that there are $300 attachments for their furnace which can turn it into a wood/oil combination unit which switches automatically to oil when the wood burns down. Wood is already cheaper per BTU in many rural areas and is a renewable resource which will not be subject to the continual price increase that oil or gas will experience.

The supply of oil and gas is still mainly in private hands. While oil and gas prices more truly reflect world availability than say electricity, there is still a tendency for oil supply companies to encourage oil use rather than reduce it. Pricing structures like electricity tend to give lower prices to high users. There are some actions in the United States which are trying to bring oil supply to consumers under public control so that advertising and price structures can be controlled. One way that a well-organized community group could obtain more control over their oil supply would be to run their own cooperative retail outlet, buying oil in bulk and deriving their own pricing structure to encourage conservation.

Recommendations

(i) - residents, tenants and community associations should retain a team of volunteer or part time senior citizens or students to run annual furnace checks on all units. Training should be arranged through local vocational centres or community colleges and equipment obtained on loan or rent from the same source.

(ii) - larger organizations should consider employing a licensed furnace technician to perform maintenance and re-adjustments on member's units.

(In Canada, a Bill (C-309) entitled "An Act respecting the domestic and industrial use of solar energy" passed second reading on February 8, 1977. Introduced by Charles Caccia, M.P. for Davenport, part of the bill's purpose is to define "rights to light" and to prepare model legislation to protect sun space).[14]

Recommendations

(i) - community organizations should make representation to local government to have three dimensional zoning in residential areas. The zoning should define a sun space for each property so that buildings only cast shadows on their own property. This may also require some housing code by-law changes, covering building orientation and siting.

3. Supplementing Existing Heating Systems with Sources of Renewable Energy

The use of wood/oil combination furnaces was covered in a previous section. (p.11). Several organizations have also started to make use of other renewable energy equipment that can be added on to existing systems such as solar hot water heaters and efficient wood stoves.

The South Eastern Vermont Community Action Group designed a two-chamber model wood stove built from discarded propane tanks and other assorted materials. The program provides training in metal working trades and produces stoves for local low-income citizens at $105. Stoves are sold retail at $235 to other buyers.[15]

The Community Environmental Council of Santa Barbara, California is building seven solar water and space heating systems in several local residences. The purpose of the program is to demonstrate and test a variety of collector systems. The Council would cover the cost of design, labour and materials, and will monitor the systems so that the results can be made available to all residents.[16]

14. Commons Debates, April 26, 1977, p. 5006.

15. People & Energy, May 1976, p. 4.

16. People & Energy, May 1976, p. 4.

Conserver Society Products Co-operative, based in Ottawa, was formed to provide members with direct access to efficient wood stoves and solar heating systems, at wholesale prices, with the added advantage of keeping all new users of the system in touch with each other through the cooperative. This should lead to a growing core of experience in the use of the systems which can be passed on to potential users.

There are also many community based programs aimed at training local people in the skills of building and installing heating systems run on renewable energy. The Survival Institute of Canada aims to expand the subject matter of its Energy Conservation Clinics (see p.8) to include renewable energy systems. Algonquin College in Ottawa is planning to include a solar technologist option in its technology and trades program in the near future, developed from its successful evening program on solar energy utilization which has drawn 50 home-owners, planners and representatives from community groups.

On the west coast, the British Columbia Solar Energy Society in cooperation with Rain Magazine from Oregon and the Eco-tope group, a non-profit education and research organization from the State of Washington, have run joint workshops on how to utilize solar energy for home heating. Eco-tope also was involved in a series of solar energy workshops run by the Soap Lake Solar Community Project in 1976. These workshops had the dual function of giving hands-on experience in the building of solar systems, and at the same time familiarizing local organizations, citizens and State Community Energy Affairs Assistants with the potential for utilization of solar energy.[21]

The State of California reacting to increased public pressure for more assitance in obtaining solar heating systems has initiated a solar technician training program.[22]

21. Ken Bossong, loc. cit. p. V-59.

22. Self Reliance #4, November, 1976, p. 9.

Recommendations:

(i) - residents'and tenants'associations and community groups should arrange a series of energy clinics where the basic principles of solar energy and wood heat can be learned by other members, and an assessment of their local application can be made

(ii) - some local training in the theory and installation of renewable energy systems should be arranged, sending residents or members who already have some engineering or technical experience on a course that will enable them to either arrange or carry out the installation of equipment. Local Community Colleges should be encouraged to get into a solar technologist program.

(iii) - purchasing of solar or wood systems should be carried out on a bulk or co-operative basis, using local producers where available and minimizing the number of middlemen. In many cases, for large orders or organizations it may be possible to either buy the equipment in kit form and construct it locally, or even manufacture it locally, making use of local resources and facilities such as abandoned factories, foundries, etc. In either case an incorporated non-profit company would be advisable similar to those described previously for insulation manufacture (p.9). On a neighbourhood scale, a community non-profit company could be formed similar to that sponsored by the Institute for Policy Studies,(p.14) provided there was a well-organized community council or other body. The advantages of local production, installation and education in solar and other renewable energy systems are many, not least being the number of local jobs produced.

(iv) - in seeking to finance the purchase and installation of solar heating systems and woodstoves, life-time credit for the equipment through a local credit union, municipality, or local utility seems to be the most equitable and economically sound way of encouraging the use of high initial cost/low operating cost systems.

passive solar heating in the building design, house orientation and layout of the site. The coop is also being developed in parallel with a farming cooperative in the Fraser Valley which will provide up to 60% of the food for the housing development. The residents in return will provide the extra labour required during planting and harvesting. It is also hoped that the housing development will include its own industries worked by the residents, such as food processing and crafts, so that the whole operation becomes more self reliant and a complete community.

On the other side of the country, Bedford Park Developments Limited is designing a 400-unit housing development which will make the maximum use of the natural environment for reducing energy requirements and servicing. Drainage will follow natural water courses, eliminating the need for storm sewers. Trees and slopes will be used for wind protection, and construction will be on post foundations with full underfloor insulation. All units will be oriented and designed for future addition of solar heating systems and some units will have solar heating attached when built. The houses are expected to sell for around $40,000 without solar heat, $50,000 with solar heat.

In Urbana, Illinois, an apartment complex has been built which is designed with a full thermal envelope of insulation and a double glazed solar air heating system with rock heat storage. Also in Illinois, in Vernon Hills, a four unit townhouse complex utilizes solar heat to provide 60% of heating, cooling and hot water.[27]

Public housing has a long reputation of being badly constructed, skimping on items that could save both the residents and the government energy and money. The National Anti-Poverty Organization is trying to bring together teams of technical consultants in various parts of the country to advise local governments on energy saving construction practices and making the most of natural heating.

27. Acorn, no. 4, 1976, p. 2.

At the same time, the Corporation is encouraging the private development of solar "mini utilities" that would be built to supply heat to traditional new housing, without taking the maximum advantage of natural heating. An additional disturbing aspect of this mini-utility concept, from the consumers' point of view, is that an external company or utility would own the solar heating unit and "sell" the solar heat to the residents.

Some communities have managed to convince municipal governments that credit for sweat equity and low operating costs should be given in granting mortgage loans. The State of Florida demands that 'life cycle' costing procedures be used in deciding on which design to use for government financed buildings.[30] The City of Ottawa has assisted two housing cooperatives in buying land and plans to investigate the possibility of solar heated demonstration units. Central Mortgage and Housing Corporation do have lower interest rates and development grants for cooperative housing, but in practice these can only be taken advantage of if housing density is kept high and front-end construction costs kept to a minimum.

In Sweden many housing developments are heated by "distinct heating" systems. Steam from an electrical power generating plant or central oil or woodfired central heating system is piped to all units in a community. This system makes much more efficient use of energy and can be adapted to use the most appropriate local fuel.

Recommendations

(i) - communities needing to develop new housing should use the cooperative/sweat equity/self-help housing concept which involves as many future residents as possible in the planning and design process and can therefore include many more innovations that would conserve energy. Coop housing developments are also well equipped to carry out other potential energy saving activities such as food production and job creation.

(ii) - new housing should be developed if possible on existing vacant sites within the community, moving to outside areas only when the quality of all existing housing has been improved, and not building on any potential food producing land.

30. Self Reliance, #2, June 1976, p. 8.

CHANGES IN TRANSPORTATION

The use of energy in transportation in North America is related very closely to both geography and life-style. People usually travel relatively long distances for both work and recreation, and this has reinforced the expectation that each person needs their own private means of transportation. Energy conservation in transportation therefore has been seen in terms of smaller more efficient cars, supplementing this with use of public transit, car pooling, etc. where convenient. Some communities and groups of residents have however gone further than this and through group action have been able to greatly reduce the amount of energy and money they use for transportation. There are also several untried ways by which groups could organize to save themselves energy. The community techniques may be classified as follows according to the degree of energy saving achieved.

1. Eliminating the journey to work - bringing more work to the community.
2. Improving public transit.
3. Developing a community run bus service.
4. Purchasing vans for driving to or from work and other purposes.
5. Arranging car pools by matching driver's homes and places of work.
6. Cooperative car maintenance.

1. Eliminating the Journey to Work

While providing the greatest potential for saving energy, this technique is seldom considered. It could however be a positive by-product of more job creation and productive self reliance in many communities (see section on Community Management). If the place of work is within walking or cycling distance, both individual workers and the community benefit financially and socially as well as conserving energy. Reduced traffic means safer roads, reduced road maintenance, more leisure time, less stress and better health.

Several groups in Europe and North America are now researching the feasibility of small scale community production of many goods and services. There is also a trend towards more autonomous local government and planning within the neighbourhood. Both of these trends will encourage the reduction of long distance commuting (see section on Consumer Regulated Economy).

3. Community Run Bus Services

In small communities adjacent to larger cities there are usually a large number of people who work in that city, but because they are outside city limits, are not served by its transit service. Two such communities which developed their own bus service to meet this need are Beacon Hill near Ottawa and Mantua, near Washington, D.C.

In September 1969, the Mantua Citizens Association decided to try to provide its own bus service and circulated a questionnaire to its members. Seventy five positive replies were received back and from the information a tentative pick-up route and schedule was designed by the Association. After a few months of negotiation a quote was obtained from a local transit company of $1300 per month for bus, driver, gas, and insurance, payable at the end of each months' service. Rates were set at $32 per month per rider or $1 per ride and the service was started with the promise of a $500 loan from the Association to cover losses during the first few months.

Local newspaper advertising, use of school children standing at proposed stops with placards, and flyers to every home in the community was not enough to get enough people to use the service when it came to forsaking their cars. Only $900 was taken in the first month but it was decided to continue and to obtain more loans from local businesses and individual "bus boosters". Another $500 was raised and after three months the service broke even. After a year all loans had been repaid.

By 1973, there was need for another bus. It was found that again some loans were necessary to tide over the operation till the second bus was full each day. By 1975, however, the community had three buses and was operating with a balance of $4500 .

Fares are collected en route by a rotating "bus-meister" and routes are continually under review to accommodate new riders. Also, the route into Washington is at the driver's discretion depending on the traffic situation. The bus service has also provided more social contact between residents and this has spilled over into the community.[31]

31. "The Mantua Experience" American Automobile Association, Public Affairs Division, 8111 Cotehouse Road, Falls Church, VA 22042.

Like the Mantua service the Beacon Hill bus service was a social experience, improving the contact between people and increasing the amount of local self-reliance. A film on the Beacon Hill service is available from the National Film Board in Ottawa.

Recommendations

(i) - residents considering the development of a community bus service should work through a local association or organization which can handle questionnaires, negotiations, promotion, operation, and the underwriting of initial losses equivalent to at least 1 month operating expenses to cover low ridership in the first few months of operation.

(ii) - operation of the system should move towards a comprehensive bus transit system which can meet both the commuter and off-peak needs of the community.

4. Van Pools

The purchase or leasing of vans for transportation of several people to and from work has received more attention since the increase in cost of fuel. If the van is well utilized it can save considerable amounts of gasoline and money for the riders compared with taking their individual private cars to work. The following cost comparison was derived from estimates made by the Office of Energy Conservation.

	Monthly Cost including gas, maintenance, tax, depreciation, etc. (per person)		
	Work	Other	Total
Private car	$40	$A	$40 plus $A
Leased van for pool	*	*	$50-$60
Purchased van for pool	*	*	$17-$25

* breakdown of costs not available.

These figures assume that the van pool only operates once per day, that van users do not own a private car, and that pool members share use of the van on the weekend. $A is the monthly cost of running a private car for non-work related activities. If a person is part of a pool using a purchased van and they also own a private car for other

The option of leasing a van rather than buying has not been widely used. It would make economic sense only if riders did not own private cars and could not see themselves being able to make the long-term commitment to purchase a van.

Some employers have purchased vans for use by their employees. The problem here is that the vehicle is company property and cannot be used on weekends and in the evening. This encourages people to retain or purchase a private car for these purposes and the full energy and cost saving is not realized.

The questions of legality and insurance for van pools are somewhat confusing. In Ontario, under the Public Vehicles Act, any vehicle operating across municipal boundaries, and involving "compensation" of any kind between riders and some third party, requires a commercial licence. This applies even to cases such as the Sarnia example where no driver is paid, and a non-profit organization in fact "operates" the van. The need for a licence also puts the operation in the same category as a private bus as far as insurance is concerned, meaning an extra premium of up to $500 per year. There is also no way of having a single insurance policy to cover all drivers. A "Non-owned Automobile Liability" coverage arranged for the organization purchasing the van might be preferable.

Recommendations

(i) - a group wishing to form a van pool by purchasing or leasing a vehicle should either incorporate their group into a corporation with share capital, or into a co-operative. Alternatively, an already incorporated residents'association or community association could be used.

(ii) - vans should be leased and purchased through the incorporated organization in whose name licensing and insurance should be arranged. Provincial laws and insurance practices covering car pooling should be well researched beforehand.

(iii) - vans should be purchased rather than leased if possible, monthly rates being adequate to refinance new vans as necessary. Financing for purchase and major repairs should be arranged through local credit unions.

The Ecology Action Centre in Halifax, Nova Scotia is working on a demonstration car pool with the Department of National Defence in their Halifax/Dartmouth facilities. Using a LIP grant they hope to demonstrate that the system can be self-supporting with only a small input from employers or other organization. The number of potential car pools is small enough for manual matching which anyway is a more personal and community oriented approach. The project has shown that a personal approach or cooperation of an employer is necessary for good participation.

Part of the Energy Conservation Program in Fort Lauderdale is a bonus system in which city employees are paid $25 if they form a pool of 3 or more.[33]

As in the case of van pools any operating car pool which involves compensation between parties and which operates across municipal boundaries is illegal in the Province of Ontario unless a commercial licence is obtained. Similar laws exist in other provinces and insurance companies indicate that car poolers should carry additional liability coverage, even when no compensation is passed.

As car pooling increases and is publicized on a wider scale, it will be necessary to ensure that the appropriate legal steps are taken - either to conform to the present laws or have them amended to exempt car pools.

Recommendations

(i) - the organizing of driver matching for car pools is best carried out through existing groups, clubs, employee, residents or tenants' associations which could also arrange for the appropriate legal and insurance coverage.

(ii) - information is required on the following
* present mode of getting to work
* home address and work address
* time of work and its flexibility
* size of car (no. of seats)
* availability of car (every day, week at a time, etc.).

Personal contact is preferable - door to door in the community and person to person at work.

33. "Local Energy Action Program Survey" loc. cit.

(3) Check compression ratio. This is important near the end of engine life (50,000 miles plus) and can be carried out with a cheap pressure guage.

(4) Check and adjust brakes to prevent drag.

(5) Regularly grease universal joints and wheel bearings.

(6) Check front wheel alignment (by observation and tire wear check).

(7) Check automatic choke system if applicable.

(8) Check and release heat riser valve if applicable.

All the above maintenance could be carried out by a group of car owners equipped with a good set of tools and some relatively inexpensive special equipment.

In three of the above items, 3,6 and 7, if readjustment is necessary, more skilled assistance will be required from a service station with special equipment. A poor compression ratio will require a cylinder or valve job. A sticking or maladjusted automatic choke will require resetting by someone familiar with the complex emissions control systems installed on North American cars since the early 70's. A front wheel alignment requires special equipment and someone trained how to operate it. For these services a car maintenance group should try to make a long-term agreement with a local service station or mechanic who would probably give more reliable and cheaper service to a local group of car owners. The club could also arrange for training in some of the minor maintenance tasks with the local mechanic. Alternatively, the club could encourage local community colleges to concentrate on gas saving maintenance in their car maintenance courses.

Aside from the advantages of better and cheaper service and better car mileage, cooperative car maintenance would encourage people to learn more about their car and how much energy it uses. It would also bring community car owners together, which could facilitate the formation of car pools and eliminate some of the problems between car owners when neighbourhood traffic plans are formulated.

CHANGES IN THE FOOD SYSTEM

All stages of the food system involve the "expenditure" of energy. However, there is a considerable amount of energy waste inherent in this system. This is partly because the production, processing, marketing and consumption of food are operated separately, often in different parts of the country, and there are few incentives to reduce the energy inputs and wastes.

Food System	Energy Inputs	Energy Wastes
Production	Fertilizers Pesticides Mechanization	Crop & animal wastes Over mechanisation Soil Deterioration
Processing & Storage	Process energy Storage energy	Processing waste
Marketing	Transportation Packaging	
Consumption		Food waste & its disposal Packaging waste

The potential for reducing inputs and wastes, however, if the system is looked at as a whole, is significant.

Copying natural systems, for example, would increase the energy efficiency of processes by using wastes from one process as the input to another, forming a series of cycles. For example, the composting of food, processing, crop and animal wastes would replace the need for fertilizer input and eliminate the cost of waste disposal.

Other potential energy savings are:

- the use of natural pest controls instead of pesticides
- the use of more labour intensive mechanization

Many modern markets are organized by city people or consumers.

Greenmarket, a fruit and vegetable farmers market in New York City was organized by urban and regional consultants. They raised foundation funds and obtained a sponsor - the Council on the Environment of New York City - in order to establish the markets. They are developing contacts with consumer groups such as food co-ops interested in direct marketing of organic produce from nearby farms and have already developed contacts with farm organizations in the region around New York City.[33]

There are many reasons for this new interest in farmers' markets. In purely economic terms they offer the promise of providing the consumer with lower grocery prices by purchasing directly from the producer, thus eliminating the "middle man". The growers, in turn, can get better than wholesale prices for the crops they bring in, helping to make it possible for them to stay in business. But economics is only one of many reasons why farmers' markets are sprouting up in many areas.

The new markets are serving to make small farmers visible once again. People are once again able to get to know the people who grew the food they are buying and learn about where and how it was grown. In the process, urban people are discovering that an abundance of food can be produced in their own local areas and they are becoming a part of a growing constituency concerned with the preservation of small-scale agriculture close to urban areas. Thus farmers' markets have cultural and political as well as economic functions, and they have a key role to play in the new agrarian movement.

In Quebec, the Movement pour l'Agriculture Biologique au Québec, an association of biological farmers affiliated to the International Federation of Organic Agricultural Movements is working closely with the Quebec food co-op network to market their products. Their aim is to provide all co-ops access to organically grown, low energy input, local produce, which at the same time will provide them with the necessary secure income to increase production

33. Rain Magazine.

Solar food dryers are also becoming widely used especially for fruit. They are very energy efficient and are not costly to build.

Freezing is necessary for the storage of many vegetables, though many others such as potatoes, cabbage, turnips and carrots are stored in root cellars for many months without spoilage, and with much lower use of energy.

Land use is an important energy consideration in food production. Many cities are becoming more and more dependent on energy intensive food sources, as the food producing lands around cities are taken out of use for housing, roads, etc. Examples of urban/rural coalitions to preserve food land have existed in California for several years. Some areas in Canada are now also becoming organized in this way. The Ontario Coalition to Preserve Food Land was founded in early 1977 - mainly to protect agricultural areas in the Niagara, South Western, Central and Eastern parts of Ontario and to pressure for an overall Ontario land use policy that will preserve food land.[36] Several other coalitions have been formed to make joint representation to the Royal Commission on Electric Power Planning in Ontario.

Reorganizing Food Systems

Towards the end of 1976 a group of Vermont consumers and farmers embarked on an ambitious joint venture in the reorganization of New England agriculture. New England Peoples Cooperative, a string of local consumer co-ops are joining with the New England Organic Farmers Organization in the creation of a mill and warehouse facility called the Food Co-op Center. The Center will be located in New Haven and will have directors from both organizations. The Center will become the device through which food co-ops in Vermont encourage farmers to begin regrowing grain by providing them access to processing, markets and financing. Most farmers at present supply the dairy products market in Boston and other Eastern urban areas, and do

36. Pollution Probe, University of Toronto.

The St. Louis Food Forum in Montreal has developed a rooftop organic hydroponics garden. Hydroponics was found to be the best method for rooftop growing, as boxes of soil tended to dry out, be too heavy and could not operate effectively without the 'parent' subsoil and organisms such as worms. The real innovation was the use of organic nutrient solutions to feed the plants. Local sources were used as much as possible, making a "tea" from high quality compost, or using a mixed solution from fish emulsion, liquid seaweed and bloodmeal. Boxes of vermiculite and perlite are used as the medium and a simple nutrient feeding mechanism has been installed. During trials in 1976, starting in cold frames, tomatoes were grown very successfully, producing one third more than comparative soil grown plants.[39]

A rooftop hydroponic greenhouse is also being built as a community action project on Chicago's West Side. The project is being sponsored by the Christian Action Ministry, a joint program of 11 Chicago churches which is also involved in alternative schools, day care and after school programs, and employment counselling. The greenhouse project arose out of a health sampling program, the results of which emphasized the importance of raising nutrition levels of community residents. The greenhouse is staffed by senior citizens and high school students and the facility is expected to pay for itself in about six months from revenues generated by the sale of vegetables grown on the roof on a sixty day cycle. The 22 x 44 foot greenhouse is seen as a pilot unit to be followed by family and block size units around the neighbourhood.[40]

A group in Northern Manitoba is planning to build a series of simple tunnel greenhouses with water drum heat storage to take advantage of the sunny spring in that part of the country and extend the usually short growing season.

39. Self Reliance # 4 November 1976, p. 7.
40. Self Reliance # 2 June 1976, p. 8.

estimates that the payback period on the greenhouse can be as low as 1.19 years if nothing but lettuce is grown, since lettuce is the most profitable greenhouse food crop for full time production. They base their calculations on the production of approximately 4,812 heads of lettuce a year, each of which can be sold for 33¢. With a mixed crop, of course, the payback period would be longer.

These figures indicate that it is feasible for a community garden program to construct and work a small greenhouse. The greenhouse could be run commercially for the first year and, after that, could also generate money in the form of savings on the price of starts and winter produce. One greenhouse with 250 feet of growing space would be able to provide the seedling tomatoes, peppers, eggplants and other vegetables for numerous gardens; and the profits from selling the starts could cover the very small maintenance and upkeep costs of the greenhouse.

Domestic Technology, Inc. offer week-long workshops in solar design and technology. The workshops, geared specifically for representatives of community organizations and agencies working with low-income people, stress both theory and hands-on experience building solar devices.

In New Mexico, Bill Yanda and his Solar Sustenance Project have provided eleven solar greenhouses for low-income families scattered in the state's northern hills. Now, the group has several community center/greenhouses under construction and has received funding to begin an urban project in Albuquerque.[42]

Another group using the designs and services of Domestic Technology is the Laramie County Community Action Program which is planning to build and maintain an array of solar radiant greenhouses in Cheyenne, Wyoming. One of the greenhouses will contain a methane digester (the first time one has been combined with a solar greenhouse) which will transform manure into burnable gas for supplemental heat,

42. Self Reliance # 6 March/April 1977, p. 3.

The employees were involved in most stages of reconstruction and operation. The co-op produces tomatoes, cucumbers and bedding plants, with plans to expand into other varieties in 1977.

While it is preferable to use soil for growing fruit and vegetables, the organic hydroponics experience in Montreal, described above, shows that it is possible to grow vegetables in an energy efficient manner on rooftops or other locations where soil is difficult to use and would rob agricultural areas to obtain. Greenhouses on rooftops may have a slightly longer payback period than backyard greenhouses, because of the increased building costs, roof modifications and hydroponic equipment. There are however, several distinct advantages to a rooftop location, as long as the rooftop is strong enough to take the weight of the garden and its gardeners.

"Rooftop space is often easy to come by: many owners are quite willing to let a community group have access to the roof of a building at no cost or for a minimal rent. For a community with little vacant land, rooftop greenhouses are ideal. Furthermore, sunlight in the city is generally better on a roof than on the ground; and the risk of potential vandalism is also minimized. Greenhouses are an important element in any integrated urban food production system; it is only a matter of time - and initial capitalization - before they become commonplace in urban as well as rural areas." [44]

A final note on greenhouses. There are several innovative methods under review for providing supplemental heat for greenhouses from waste or renewable energy sources. The University of Saskatchewan Department of Horticulture is experimenting with the use of waste heat carbon dioxide gases for stimulating plant growth.[45] Eric Helbig of Tennessee has estimated that sunflower stocks are an excellent heat source when burnt like wood, producing 450 million BTU/acre.[46]

The growing of vegetables and fruit in community gardens requires some practical training and experience. The use of greenhouses also

44. Self Reliance # 6 March/April, 1977. p. 4.

45. Conserver Society Notes, Science Council of Canada, Fall 1976, Vol. 2, No. 1, p. 47.

46. Nuclear Opponents, February 3, 1977.

Recommendations

(i) - the most energy efficient way of obtaining food is a combination of the following elements

* a community garden to provide as much of a year supply of vegetables as possible, owned and operated by a group of residents or a whole neighbourhood
* a food cooperative to market the food produced in the garden, to bulk buy other foods such as fruit, dairy products and dry goods, preferably through direct exclusive arrangements with local suppliers, or through development of farmers'markets
* a food processing and storage facility to allow members of the group to either eat in season or eat foods that are plentiful and cheap at certain times of the year and easily processed and stored.

(ii) - community gardens can be operated in parks, on vacant lots, in yards or on rooftops. Soil based operations are preferable, but hydroponics operations are best in yards or rooftops where growing beds must be constructed. Both kinds of operation can be carried out organically. Compost for fertilizer/soil conditioner/hydroponic feed can be produced from local sources of organic waste-household waste, vegetable waste from stores, sawdust, leaves and grass cuttings. Composting can be carried out in high rate (3-4 weeks) odourless units attached to the garden or in neighbourhood scale recycling/resource depots (see Community Resources from Waste). Hydroponic units should use vermiculite/perlite/sand mixtures because of their moisture retention and light weight. Solar designed greenhouses can be used to increase the growing season both with soil based and hydroponic operations. Each greenhouse should be designed to maximize solar input for the latitude of the operation and contain some heat storage mechanism such as water filled drums or rocks. If supplemental heat is required, renewable sources such as wood or methane should be used where possible.

COMMUNITY RESOURCES FROM WASTE

Besides the skills and abilities of people, and the land itself for housing, industries and food production, there are many valuable resources in communities which are normally classified as"wastes". The reason that they have become wastes is because the system used to produce and market most of our goods and services does not allow the return of by-products to locations where they can be used to produce new goods and services. Because energy is required to both produce something and to dispose of it, there would be a vast energy saving if wastes could be recycled to effective uses. This is a common occurence in natural processes which are not able to supplement energy saving needs with non-renewable fossil fuels like humans. In fact some economists are now saying that we should treat our economy like a natural system with resources and wastes being the "capital" and "products" of the economy, and our goods and services being only the by-products of the economy. The concepts of waste, environment and recycling would then take on a different, more important, meaning and help us move towards a more stable self-sustaining economy. [49]

The problem for consumers faced with this energy waste due to the lack of recycling, is that the regulations which control the economy still favour the use of virgin materials and resources (e.g., transportation rates, mining subsidies, development grants, etc). The consumer also does not control the energy inputs to production or to disposal of waste; only pays for them through the cost of goods and through municipal taxes.

Regionalization of many municipal governments has aggravated this situation. In Ottawa for example, the city of Ottawa and surrounding townships are responsible for collection of wastes (e.g., sewers and garbage collection) while the Regional Municipality of Ottawa-Carleton is responsible for treatment and disposal. There is no hope for the efficient handling of resources in this situation, and with representation and taxes paid only at the municipal level, there is little individual consumers can do about it.

49. N. Georgescu-Roegan "The Steady State Economic Salvation" Earhart Foundation Paper, 1976.

share in the year's profits according to the amount of solid waste contributed. Initial financing was through the sale of 5 year, 7% notes to the members.[51]

A similar 'recycling plant' has been set up at the town dump in Nottingham, New Hampshire. Over 90% of residents are separating out glass, paper and metals before going to the dump, and are also bringing larger reusable items for reconditioning. All residents are provided with a three compartment can to facilitate the separation, and a recent survey revealed that the recycling system was considered the most effective municipal service.[52]

In communities where there are regular garbage pick up services, it is more difficult to develop a system to completely recycle waste for use in the community or surrounding areas. Most only get as far as having drop-off centres for glass, paper and metals, in addition to regular door to door pick up, and do not process the collected materials but rather sell them through brokers to large processors often many miles away. This approach often ends up costing the municipality money because they have to run two services and get very little from sale of the materials. It is also doubtful that there are any energy savings.

There are exceptions, however, where communities have gone beyond this.

In Huddersfild, United Kingdom, the Oxfam Wastesaver operation provides householders with a free unit on which four different coloured garbage bags are hung - one for glass and tin, one for newspapers, one for plastics and aluminium, and one for reusable things such as clothes, rags, toys, etc. Over 60% participation by the public has been achieved, accounting for 25% of all waste in the city. The Wastesaver vans go door to door picking up the colour coded waste bags, and any larger articles such as stoves, and take them to a large warehouse (an old mill purchased from the City). Here the materials are sorted, some manually (e.g., rags, clothes, etc) some by machine (e.g., glass and magnetic metals). The sorted materials are then processed into

51. Self Reliance # 5 January 1977, p. 8.

52. Self Reliance # 6 March/April 1977, p. 8.

Some communities and organizations in Canada are looking into the possibilities of manufacturing cellulose fibre insulation from newsprint. A food cooperative in Kamloops, B.C. which already operates a recycling drop off centre and transports the materials to Vancouver for sale when their truck goes to pick up food for the co-op, is considering such a plant to help upgrade the wastes collected into usable products.

Peter Middleton and Associates of Toronto are carrying out a study for the federal government to determine the economic viability of a large cellulose fibre insulation operation in the Maritimes. The results of this study together with the continued work on small scale operations by ITDG in London should greatly help communities and other groups to set up an energy and resource saving venture and provide local jobs and a needed product at the same time.

Besides those mentioned above, the range of processes that could be operated on a community scale to convert locally produced waste into needed goods is growing - waste crank case oil into motor oil, glass cullet into new glass or road surfacing material, newspaper into poultry or cattle bedding and feed, aluminium cans into solar collectors or cast aluminium objects, to name a few. There has even been talk recently of recovering chitin from waste crab and lobster shells. This versatile renewable substance can be converted without the input of high energy into food wrap, coagulents, chemical filters and many other products.[55]

In areas close to existing markets for unprocessed waste, most communities and groups have concentrated on the collection side of the operation. Through the work of Pollution Probe, IS5 and a number of representatives from local communities, the subcommittee of Metro Council in Toronto, responsible for advising on solid waste disposal, was strengthened to become an organization with a budget to operate a series of drop off centres across the city. TRAC, as the organization is called, is run by a committee of two community organizations representatives, a number of aldermen and public servants from Metro and representatives from expert groups such as IS5 and Pollution Probe. TRAC

55. Work at Massachusetts Institute of Technology.

> perhaps the crowning blow in the chain of solid waste related problems is the economic loss to the public from our throw away practices...The evaluation of various resource recovery and solid waste strategies should be on the basis of -
>
> * tax burden impact (reflecting capitalization and operating costs)
> * positive economic impact (primary and secondary jobs produced)
> * environmental quality impact
> * resource depletion impact
> * net energy yield of the system

Source reduction and recycling come out on top under all these criteria.

In Marblehead and Somerville, Massachusetts, weekly door to door collection of glass, steel, aluminium and paper is being carried out with experimental three compartment non-compacting trucks. One compartment is for paper, the second for clear glass, steel cans and aluminium cans, the third for coloured glass, steel cans and aluminium cans. The two glass categories are considered profitable (IS5 in Toronto confirmed this) since clear glass is worth twice as much as coloured glass. The two towns sell the three mixed materials to a processor in neighbouring Salem who has magnetic and other separating equipment.

Residents in each town are expected to collect the recyclables in the 3 categories, placing them at curbside in paper bags or boxes. Plastic bags are permitted only for regular refuse which is collected in a separate vehicle (on the same day). In Somerville, 60 to 80 per cent of residents participate in the program, which recovers 25% of the town's waste. In Marblehead, there is an experimental $50 fine for those who do not keep recyclables separate from their household refuse, though it has not yet been used.

The towns have long-term agreements with the processor for sale of the collected materials, with prices keyed to the open scrap market, subject to guaranteed floor prices. This floor price guarantee is considered more important than getting top prices, to retain stability in the program. Selling mixed metals and glass only slightly decreases

Swedish glass workers, faced with the threat of plant closure and dismissal are demanding the right to work on socially useful and environmentally appropriate products. In Surte, where the bottleworks is located, glass-making is the backbone of the economy. Workers have refused to accept management's claim that bottles are uneconomical. With the help of professors from the local university, they have countered with arguments based on the analysis of the environmental merits of glass as compared to the alternatives of plastic or aluminium throw away containers. They have met with local government officials and await an answer.[60]

Because sewage disposal is usually either carried out on an individual basis (e.g., septic tank) or on a municipal basis (e.g., sewage treatment plant) there is not much scope for communities or neighbourhoods within large urban areas to operate sewage digesters and composters that could produce methane and fertilizer. Some large treatment plants have made sludge available to farmers but it has never been processed into safe inert forms, and recent heavy metal and virus scares have halted the practice in many places (even though in the case of viral and bacterial contamination, they can be completely removed by using the correct composting procedure). This important link between the waste products of food consumption and the land growing that food, remains the least investigated part of an energy conserving urban/rural system.

60. Ibid.

collection/recycling operation of other materials coordinated by a TRAC type agency might be the best approach, and would greatly reduce pressure on local landfill sites. Good public education programs are very important for this kind of operation. Once again it is important to start small and use existing residents', tenants' or community associations.

(vii) - all communities and groups should press for the removal of preferential transportation rates, mining subsidies and other advantages given to virgin resources.

(viii) - community associations, employee groups and unions should analyse the type of product and operation at their place of work. Recommendations could be developed on the processing of various wastes into new products, the elimination of energy wasteful products, and the preferential use of recycled raw materials. This would include analysis of the municipal sewage sludge for heavy metals. If it was free from contamination, recommendation that the sludge be composted and sold as fertilizer should be made to the municipality. If the sludge were contaminated by metals, a city ordinance directing industries to dispose of their own heavy metal effluent and not use the municipal sewer, should be demanded

Recommendations

(i) - smaller groups should consider the joint purchase of items such as grass cutters, furnace checking equipment, wood working equipment and any tool, appliance or equipment that would be regularly used but not very frequently by any one member of the group. If available, working areas could be set up in community centres (e.g., wood working shops) or in neighbourhood facilities (e.g., car maintenance cooperative).

(ii) - larger groups could consider the joint purchase of equipment that might be used only once by each member such as insulation equipment, and other home renovation equipment, etc. With major equipment, some arrangement could be made to rent it to other communities and smaller groups.

(iii) - the ownership of equipment could either be on a co-op basis, each member paying towards the purchase price, then having free use of the item, or on collective bases, a small number of group members purchasing the items and renting them to others much the same as a rental firm does.

COMMUNITY MANAGEMENT OF ENERGY USE

While collective action by a small number of citizens can reduce energy use and the cost of energy, far greater savings can be achieved if the whole neighbourhood or community is involved. This means that most aspects of energy use must come under the control of the community. In most communities this is difficult to achieve, because traditionally energy has not been a community concern.

- electrical utilities are provincially based, and local hydro commissioners are non-elected officials with few powers.

- oil and gas pricing and distribution is controlled by government regulation and the oil industry.

- most transportation decisions are made at regional government or provincial level.

- food production, processing and distribution is controlled by government marketing boards and food companies.

- the majority of industrial production of goods and services takes place outside the community.

Against these odds, several communities have managed either directly or indirectly to gain some control over energy use; predominately indirect energy savings resulting out of action to control some other aspect of community life such as utility prices, traffic, housing costs, employment etc. This tends to indicate that the conservation of energy is dependent on the way in which communities are governed, serviced and provided with goods. The present system seems to encourage energy waste, while more community control and self reliance encourages energy conservation. This would also explain the apparent disinterest in conserving energy as a priority for most people.

Some cities in the United States are beginning to launch energy conservation programs of their own, independent of State energy policy. The City of Seattle, for example has adopted a Conservation Program Proposal which includes substantial energy conservation projects and the use of solar and wind energy. The city sees this approach as preferable to participation in two nuclear power plants planned by the Washington State Public Power Supply System. The proposed Seattle program would establish a City Energy Office to: develop information for residents about energy conserving appliances; certify energy efficient homes; adopt new heating and cooling standards for commercial buildings and performance standards for industry and business; study ways to improve the efficiency of power generation and transmission and the effects of rates on energy consumption; and look at the use of wind and solar energy.[62]

The city of Bridgeport, Texas has passed a resolution that would make it self sufficient in electrical power by 1978 through the building of a solar electric plant in the city.[63]

> One of the best comprehensive community energy conservation programs is being run by Davis, California, a small city 12 miles outside of Sacramento. Three years ago, the Davis City Council convened a committee of architects, meteorologists, planners, and citizens to survey energy use in Davis and to make recommendations for reducing energy used for space heating and cooling by 50%. The group drafted a new ordinance controlling building design elements such as window area and orientation, amount of insulation, building heat storage capacity, and building orientation, so as to take maximum advantage of natural heating and cooling. The final ordinance was accepted by the city planning commission and ultimately approved by the city council.

62. Conference on Alternative State and Local Public Policies, Newsletter # 4, January 1977, Institute of Policy Studies, Washington DC 20009, p. 3.

63. Self Reliance # 1, April 1976, p. 6.

Other U.S. cities which are developing community or small city scale energy conservation plans include Indio and Anahiem, California, Hobbs, New Mexico, and Portland, Oregon where a prototype local energy planning system is being developed.[67]

2. Community Involvement in Electrical Utilities

Conservation of energy is only one of the reasons why many communities are trying to gain more control over the provision of their electrical power. The most common reasons are high and inequitable rate increases. Others include opposition to the use of nuclear power and opposition to the destruction of food producing land by generating and transmission facilities. Whatever the reasons for wanting more community control, however, the results would indirectly lead to conservation of energy. A reformed rate structure based on higher rates for large users, and "at cost" or marginal rates for small users would lead to an overall drop in energy consumption. The dropping of nuclear power as an energy alternative would lead to the use of conservation and renewable energy sources to meet future energy needs. The protection of food land would lead to smaller more decentralised generation systems which would in turn lead to increased energy awareness and encourage a greater dependence on local food production.

Any move to increase the community participation or control of electrical utilities can therefore be seen as a potentially energy conserving move. This is further supported by the actions themselves which invariably include a mention of energy conservation as a corollary to their demands.

67. Local Energy Action Program Survey, Centre for Science in the Public Interest, Washington, D.C 20009.

Alberta is the only province to provide financial assistance to "serious intervenors" at rate hearings.

In Nova Scotia, the Ecology Action Centre appeared before the Nova Scotia Board of Commissioners of Public Utilities who were considering the application by the Nova Scotia Power Corporation for a rate increase of 63%. In hearings that were extended from 3 weeks to 5 months, Ecology Action Centre brought in expert and community witnesses in support of their brief which demanded the implementation of non-discriminatory" marginal cost rate structure possibly based on a customer charge flat rate structure, and/or with seasonal pricing, and/or with provision for time of day pricing on an optional basis." They also submitted evidence to show that the present rate structures encourage energy waste and that the proposed price increases would discriminate against small low-income users. The cost of the intervention was $40,000 excluding the cost of a local lawyer who offered his services free. The National Anti-Poverty Organisation also was represented at the hearings by the Public Interest Advocacy Centre, whom NAPO intend to use at other hearings accross the country if sufficient funds can be obtained. NAPO also supports the concept of marginal cost pricing as a means to take the pressure of new hydro capital spending offthe shoulders of small users who do not need the new facilities, and to encourage conservation (For a full discussion of marginal cost pricing and U.S. experience see Energy Robe report by Conway). The impact of the Ecology Action Centre's intervention on the Nova Scotia Board of Commissioner's was considerable, though their decisions are unknown at this time.

Both organisations representing municipal power commissions fear that rate reform will discourage industrial development (a fear disproved recently by the U.S. Bonneville Power Administration).

One interesting example of independent action by a municipal utility in the United States is in the City of Burbank, California where the city council and the utility have worked together to curb unnecessary power use, and have acheived a 17% reduction in electrical consumption.[68]

3. Energy Conservation as a Result of Community Development

In the past, the term community development has usually been used to describe the administration of welfare, medical and other services in the community. In recent years, however, it has come to include economic, cultural and political development as well. The development of local manufacturing, the creation of neighbourhood traffic plans, the formation of community councils all can now be called Community Development.

Many of these initiatives either include references to energy conservation and energy issues or indirectly save energy for community residences. The Glebe Traffic Plan in Ottawa, for example, primarily developed to keep excess traffic off residential streets, has reduced speeds and increased the use of public transit. Increases in the number of bikeways in many communities has decreased the summer use of cars.

68. Local Energy Action Program Survey, op. cit.

In many cases these centres include information on energy use and conservation. Other communities run energy related programs at their Community Colleges or high schools.

The information services with the most long term benefit are those working out of a storefront location within the community. The Community Information Centre and its neighbourhood branches set up in 1974 in Vancouver are good examples. It was planned that these centres would become the focal point for community development, but government changes in more recent months have slowed this process. A good review of storefront information centres that cover all aspects of community development and energy issues is given in the November 1976 edition of Rain Magazine (p. 2). The advantage of this type of information project is that it promotes two way discussion and learning - a fundamental prerequisite to community self reliance and development. Another Canadian example of a storefront centre is the Urban Information Exchange in Winnipeg at 455 Ellice Avenue.

Another good method of promoting two-way learning are the "Learning Exchanges" being organised in several communities. The Ottawa Learning Exchange, for example, helps to match up people who would like to exchange skills. A builder wanting to learn how to do accounting and books, for instance, might be matched up with an accountant wanting to learn how to instal insulation. The result is a general improvement in the skills and self-reliance of the community and a greater understanding and awareness of how different elements of the community work.

as energy and make the maximum use of human,renewable and recycable resources. The Institute of Local Self Reliance in Washington D.C. has helped many communities reach this stage and followed the course of many others. The sweat equity renovation of tenements in New York City with full insulation and solar heat is one example (see section on Housing). The production of compost from market waste in the Bronx is another (see section on Community Resources).[71]

The transfer of community development and energy information by demonstration has also been very successful. The Technology for People Conference/Alternate Energy Fair held in 1976 in St. John, New Brunswick looks like it will become an annual event. The Toward Tomorrow Fair in Amherst,Massachusets is an annual event that attracts many thousands of people. These fairs seek to demonstrate how a future decentralised self-reliant society would make use of energy conserving techniques, renewable energy sources and other appropriate technologies.[72] The Farallones Institute in Berkley, California is a good example of an institution set up to both demonstrate and give training in social forms and skills that would produce an energy and resource conserving community. Courses at the Institute include urban organic gardening and how to analyse energy flow in daily activities. At the same time the members of the institute live what they are teaching, keep a record of energy and resource use and demonstrate the advantages of alternative politics and technologies.[73]

71. David Morris of ILSR at Small is Possible Conference, Vancouver March 23-25, 1977.

72. People and Energy May 1976, p. 4.

73. Self-Reliance # 1, June 1976, p. 10.

energy conserving equipment and information. In the Making is a British publication which is a directory of co-operative enterprises and a forum for discussion of the possibility of self management, both now and in the future. It is a source of practical information and ideas and covers the development of ways of making socially useful products and services that are ecologically sound.

It is interesting to note that In the Making grew out of programming on the Open University - a TV/ correspondance type university which has been very successful in increasing the transfer of skills and information to communities which would not normally have access to them.

Recommendations

(i) groups of residents or consumers interested in seeing their communities conserve energy should see it as a "plank" in a "platform" of municipal reform. Energy conservation will follow from a general movement to increase the community management and production of goods and services.

* community energy coordinators and a community energy committee (elected jury style for example)should be appointed to carry out energy planning. Responsibilities of the energy committees could include:

1) development of traffic plans, car pools and community bus services.

2) encouragement of farmers'markets, local food production, food coops, food storage facilities and greenhouses.

3) arrangement of heat loss review programs with homeowners and tenants.

5) demand freedom of information on energy supply issues.

6) encourage local utilities to look into local energy saving technologies and energy-generating systems, e.g. heat pumps, district heating, hydro electric sites (small), wood electrical generating stations etc.

7) push for individual metering in all buildings.

* The job creation potential of energy conserving and renewable energy manufacturing ventures should be taken advantage of. Typical ventures could include:

1) manufacture and installation of insulation in homes.

2) glass container production from waste glass.

3) manufacture of wood stoves and solar energy system components.

4) urban market gardening using green-houses.

5) community scale food storage and distribution co-ops.

6) community bus services.

* Community information centres should be set up in each neighbourhood providing a two way exchange of views and information ; a place where people can exchange skills and plan the development and management of their community. Information centres could be run out of community centres etc. and be supplemented by neighbourhood run newspapers, directories, radio and TV programming. A full range of material on energy issues should be included, but this should be part of an information and display system on science and technology useful to the community. This could include for example technical information useful to

B. EXAMPLES OF COMMUNITY FINANCING OF ENERGY CONSERVATION TECHNIQUES

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1. The Seattle Trust and Savings Bank has become the first in the U.S. to offer low-interest loans to consumers who want to buy energy efficient houses, cars, boats or make energy-conserving improvements in their homes. Qualified homebuyers (whose homes presumably meet a certain building standard) can get 30-year home mortgages at 8½%, a full point lower than current mortgages, creating a saving of more than $10,000 over 30 years. People buying new cars which get 25 MPG or more can get 4-year loans at 8¾%, a half point lower than most commercial banks. Sailboats automatically qualify for the 8¾% rate and power boats which meet standards concerning engine size and efficient hull design may also qualify. In perhaps the biggest bargain, home improvement loans to make a house more energy-efficient are also going for 8¾%, compared to the standard 10½% to 12% charged at most other banks. The loan program was designed by Wilson Clark (Energy for Survival) of the Cascadia Institute, Rte. 2, Box 111, Cle Elum, Washington 98922 (Source: People & Energy, August 1976, p. 9)

The incentive here for the bank is the better financial risk of the consumer who saves money through energy conservation. The lower interest rate is a recognition of this lower risk. In return there is an incentive for consumers to save energy as they get direct credit for their choice of product.

2. The State of New Hampshire has enacted tax legislation which allows local communities to decide whether they give property tax exemptions on solar heating equipment. The communities can also decide how much the exemption is. Arizona, Georgia, North Dakota, Michigan and Illinois have brought in some form of statewide exemption on solar equipment. Montana

4. The Opportunity Funding Corporation, a private, non-profit organization established in June 1970 has helped launch several new investment vehicles that will foster the creation and transfer of wealth into minority and low income communities. One is the Southern Agricultural Corporation, which was launched in 1976 to advance the development of profitable community-owned agricultural operations. (Source: Self Reliance #5, January 1977, p. 8)

5. The Fund of Common Sense is a non-profit group formed in Ottawa in 1975 to channel private funds into imaginative, innovative new ventures and ideas that will result in new economic and social structures in the community.

6. The Municipally-owned utility in Oscala, Florida and a local company, Wilcon Inc. have worked out an interesting system in which residents may lease solar water heaters with option to buy later. Wilcon installs the solar hot water heating system at no cost and maintains the system free of charge. A BTU meter is installed to measure the amount of energy going into the water heater. The BTUs are converted to kilowatt hours and charged at the current electricity rate. This total is then reduced by 25%. Some of the remaining payment goes to the city for services rendered, such as billing, meter reading and accounting. Another smaller portion goes to the city as compensation for the loss of revenues to the municipal utility company. The rest goes to Wilcon. After five years, the customers charge is reduced to 50% of what the monthly charge would have been if he or she were using electricity at then current prices. After ten years the customer can purchase the system for $1. The company estimates it can break even after four or five years; the customer saves money immediately and finishes up with free hot water; and the city does not lose revenue. Santa Clara, California and Tacoma,

unions are located. (Source: Self Reliance No. 3, September 1976, p. 7)

9. Three Canadian Credit Unions are taking a new approach in their savings and loan service that will help to make more working capital available in the communities which they serve - The Community Congress for Economic Change (CCEC) Credit Union of Vancouver, the Caisse d'Economie des Travailleurs Réunies in Quebec, and the Saskatoon Anti-Poverty Credit Union. By having no interest "savings" deposit accounts, the credit unions can offer low interest loans to food co-ops, housing co-ops and individual members. By using these co-ops, members can then get a better return on their investment (because of increased buying power) than they would through putting money in the bank. (Source: Ontario Public Interest Research Group, University of Waterloo, Waterloo, Ontario and CCEC Credit Union, Vancouver, B.C.).

10. The Royal Bank of Canada is experimenting with Community Branches in low-income areas. The objective is to make banking services available to people who would not qualify for loans when assessed by the formal bank credit procedures and would often fall victim to loan sharks. The formal credit risk evaluation process is replaced by informal discussions, budgeting and assessment of potential between the people and the bank. Loans usually vary from $50 to $1500 for individual debt consolidation or consumer purchase. Interest rates are ½% below market. Experience to date in low-income areas of Winnipeg, Toronto and Montreal indicates that once the branch is established there is enough income from local savings to cover the loans. Royal Bank states that home improvement and small business or cooperative ventures would be eligible provided the ability to budget

on the basis of their past social responsibility. In Washington, D.C., public pressure forced one savings and loan company to increase its in-city loans from 5% to 24%. In Los Angeles, a citizens' group is preparing a series of county maps in order to illustrate the lending patterns of various institutions. In Washington, D.C., a community organization, the Adams Morgan Organization is petitioning that a new savings and loan branch of a company be opened only if it (1) adopts a loan program designed to encourage home renovation and purchase by current residents and (2) nominates a community representative for election to the company's board of directors. (Source: Self Reliance, No. 4, November 1976, p. 6/8; No. 2, June 1976, p. 4).

15. Several community land trusts have been set up in the United States which operate entirely with urban holdings. The Neighbourhood Foundation in San Francisco and the Adams Morgan Community Cooperative Housing Trust acquire land and buildings for use as housing. Residents and the trusts own the land and buildings jointly, financing restoration and preventing speculation. On the East Coast, the Roxbury Land Trust is responsible for the development of 175 acres of vacant public land into community owned housing, industry and parks. (Source: Self Reliance, No. 2, June 1976, p. 13).

In Canada, non-profit housing corporations form a type of community land trust. These corporations without share capital, purchase and renovate housing, using guaranteed federal mortgages, then rent the housing to residents, protecting both the land and community from speculation and improving the quality and the energy efficiency of housing.

C: STRATEGIES FOR A CONSUMER-REGULATED ECONOMY AND ENERGY SYSTEM

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If Canada is going to adequately tackle the energy question and use energy conservation as a key ingredient of overall energy policy, there must be more encouragement of community scale energy conservation and energy self reliance. For communities to conserve energy, however, they must have more say over the production, distribution and financing of energy and energy use. Ultimately the consumer pays for the rate of energy consumption, and energy management should preferably be in consumers hands, with government, industry and utility agencies providing the technical support. The following section of this report shows that a decentralised consumer regulated economy is a prerequisite for such an energy system. It would also provide more jobs and economic stability at a time when Canada is looking for a democratic and equitable way out of the unemployment inflation spiral.

Barriers to Consumer Regulated Energy Use

There are several institutional barriers and "myths" which work against the adoption of energy conservation as a key social priority, and against the introduction of consumer managed energy systems. It has traditionally been assumed that energy use is directly related to economic growth, and that a reduction in energy use would reduce economic growth and increase unemployment. It has also been assumed that central management of energy generating capacity is more "efficient" and therefore community control would be inefficient and wasteful. There are many recent indications, however, which show that central energy management coupled with the high use of energy from only a few large sources creates an unstable and inherently undemocratic system.[1]

1. "The Unfinished Agenda". A Task Force Report Sponsored by the Rockefeller Brothers Fund, Crowell Company: NY 1977.

compares the job creating and energy saving potential of switching from the present way of producting various goods and services to a more resource conserving one. For example if goods were transported by freight train instead of private truck, and the resulting savings in energy were not redirected to wasteful uses (e.g. recreational plane travel) then 675,000 new jobs could be created for every quadrillion BTU of energy saved. In other words "modified" consumption patterns lead to less energy use and more jobs.[5]

The question to be asked here is what has caused the constantly expanding demand for energy and the acceptance of substituting energy for labour? Also why is there no visible sign of the desire for a "modified" consumption pattern by consumers? And why do government and industry still favour the substitution of energy for labour and continue to develop larger and larger energy production units? To answer these questions it is first necessary to take a brief look at the nature of industrialised society.

The whole industrial production sector, (including the laws and regulations which govern it, and marketing tools such as advertising) is geared to maximising growth of consumption and maximising replacement. In a so called free market economy, consumers are supposed to be able to control this production process by selective buying. However, the industrial units of the system are so large that they cannot respond to consumer demand or society's needs and therefore have to control what consumers want through advertising and hold on to their

5. Bruce Hanon, "Energy and Labour in a Conserver Society" Energy Research Group, University of Illinois, July 1976.

production process.[10] The long dispute in the Canadian Post Office is in part due to a resistance against automation or "technological change". Workers see these changes as reducing both the responsibility and number of jobs which increases management control and leads to poorer service.

The concept that energy use and industrial development are determined by the needs of capital rather than the public also explains the present paradox of high unemployment going hand in hand with economic "recovery". As more capital and energy are substituted for labour, the recovery will include fewer and fewer people - resulting in structural unemployment, loss of work satisfaction, more crime and destruction of community life.

Technological changes, technical fixes, and scientific innovation are therefore not neutral, objective forces but can be chosen to "suit" the needs of various interests in society. This applies equally to energy systems. Millions of dollars have been poured into nuclear power; an energy source that fits easily into a system of centralised industrial production, requires extensive central government regulation and security forces and can only be operated by specialists. Energy conservation, certain solar and wood energy technologies on the other hand which would free most consumers from high fuel bills and make them more independent of the state, have received little research funding in comparison.

If scientific "discovery" and "innovation" are therefore dependent on the power structure in society, it would indicate that the approach to energy conservation should be through political rather than technological means.

10. "Jobs and Energy", loc. cit. p. 2.

A Minimum Throughput Economy

N. Georgescu Roegan [12,13] and several other eminent economists and ecologists [14] have recently shown that our economy does not operate any differently from other systems in nature. We might measure the performance of an economy by its output, but a natural system will seek to minimise its materials throughput (raw materials ≠ products) by maximising recycling and re-use. In this way it "protects" itself against the second law of thermodynamics which states that conversion of energy renders that energy less and less useful. Hazel Henderson, of the Centre for Alternative Futures in Washington has suggested that we would be wise to develop an economy based on this natural minimal throughput concept rather than continue to use one based on maximising material production and consumption.[15] Such an economy would, like natural systems seek to maximise recycling, diversity, self management and production of its own goods and services, and consequently become more independent and stable. Because materials or capital could not be easily substituted for renewable "resources" such as labour and solar energy, production of goods and services would also involve less waste and employ more people (the minimum throughput version of efficiency).

This type of economy cannot be brought about simply by de-regulating the present economy and letting market forces and free-enterprise control supply and demand. As indicated above, today's production systems, technologies and regulations have all been developed together. Unregulated

12. N. Georgescu Roegan "The Entropy Law, the Economic Process" Harvard University Press, 1971.

13. N. Georgescu Roegan "The Steady State Economic Salvation" Earhart Foundation Paper, 1976.

14. Howard T. Odum "Environment Power Society" John Wiley and Sons, 1971.

15. Hazel Henderson "The Coming Economic Transition" Technological Forecasting Social Change, 8 000-000 (1976) March 1976, p. 337.

In the United Kingdom, proof that small scale, conserving, safe technologies are both practical and beneficial is coming from a group set up 10 years ago primarily to assist developing countries with "intermediate" technologies. The Intermediate Technology Development Group (ITDG) now see their technologies more as "appropriate" to community development in any country rather than some stepping stone to complex technologies. They suggest that local production of goods and services using simple sophisticated small scale technologies is Britain's answer to structural unemployment, inflation and public dissatisfaction. By substituting labour for capital and manufacturing on a small scale, goods and services can be produced in a humane way, and control of the production process can remain in the hands of the producers and consumers of the community.[19] It has been shown elsewhere that this can lead directly to increased social responsibility, conservation of resources and maximum re-use of materials[20] - a minimum throughput economy. ITDG started their UK program by "importing" some ideas from developing countries such as small scale glass containers and unfired brick manufacture. Now several UK universities are working on other small scale process units and ITDG is working closely with urban rural development groups and worker co-operatives to put them into operation.[21]

19. George McRobie, ITDG at Small is Possible Conference, Vancouver March 23-25, 1977.

20. Michael Taylor "State and Eco-State" Resurgence Vol. 8, no. 1 March-April 1977, p. 27.

21. John Davis, Report on Activities of ITDG UK Program, ITDG, 9 King St., London W2, 1977.

In Toronto, the Movement for Municipal Reform (MMR) have begun to incorporate the above type of demand into their platform. They are proposing reforms to give neighbourhoods more control over taxation and planning - distributing the tax burden more equitably. They are also opposing express way extensions until public transit modes are accessible to all citizens. The MMR was partly instrumental in the formation of the Reform Caucus in the City of Toronto, and directly work for selected candidates in civic elections. They are now working with groups such as IS5 (see Community Resource section) on ways to run services at the neighbourhood level based on available local resources and taxes. In Montreal, the Montreal Citizens Movement is also proposing more decentralised services and community management.

Ralph Nader visualises the progress towards a minimum throughput decentralised economy as being through the formation of a network of consumer co-operatives. Starting with food co-operatives, a network could grow up through food warehousing, appliance repair, dry cleaning, workshop and other service co-ops to production co-ops for food, hardware, and other consumer goods. If these co-ops were linked together either by direct spending one to another, or through a local credit union, not only would there be a tendency for material capital throughput to be minimised (recycling re-use etc.) but there would also be a recycling of money within the community - requiring less community capitization and more goods, services and jobs per dollar.[23]

23. Ralph Nader, at Week for the World workshop, July 1975. Ottawa.

and social development, especially in developing countries. Capital shortages in industrialised countries and capital debt in developing countries could provide worldwide interest in decentralised, labour intensive alternatives, but will only occur if political change can stop the concentration of capital in a few hands. A minimum throughput economy cannot function unless the available capital is distributed equally for use within communities.[26]

David Morris sees the most urgent action as being in the areas of neighbourhood planning and worker participation. Most examples to date, though well intentioned are often discouraged when they go "too far" in the eyes of government or industry. Worker self-management at Polaroid, for example, was discontinued because managerial jobs were threatened, even though production and product quality increased. In other words a technological innovation was abandoned because it decreased the influence of owners and managers. The city of Portland, Oregon on the other hand is beginning to experiment with the block grant concept for community self-management. After two to three years, the infrastructure and confidence for community control is beginning to develop.

Increased community control of planning and production should go hand in hand with a new definition of what makes a good product. Artificially ripened tomatoes and air filled sawdust bread may be cheaper but only because the most important criteria - nutritional value - is not considered. David Morris sees the use of a nutritional tax on different products to bring about a more favourable climate for local high quality food production.

26. David Morris ILSR at Small is Possible Conference, Vancouver, March 23-25, 1977.

He suggests that as an initial strategy, groups of residents conduct a survey to determine the capital and resource "leakages" from the community - what resources (including people's skills) are wasted or exported unused, what goods have to be imported. The survey could then seek to determine the types of goods and services which could be produced locally to redress the trade balance, basing the first choices on peoples needs and available local skills. Priority needs might range from a cheaper source of fresh vegetable to aspirin. Local skills would include people who would like to turn hobbies into jobs, retired people, laid off workers and new graduates. Door to door surveys would be preferable to help break down the barriers to local production such as product loyalty, the myth of size being more economic, the myth of complex technologies being necessary etc. It would also be necessary to show that the proposed enterprises would be either community owned ventures or worker co-operatives to ensure that the enterprise would continue to meet the communities needs. Enterprises owned and controlled by one or two people tend to develop their own interests rather than the communities once they start to be successful and start to "employ" people. These interests can result in moving to other communities, use of machines to replace people - in fact progressing into the very type of enterprise which they were created to replace.

Community enterprise should start and remain small, and should seek to meet short term needs which can be quickly built upon with other ventures. Barry Stein suggests that production of basic pharmaceuticals such as aspirin and household items such as cleaners are good starting items. They are not hard to make and give fantastic profit margins to

neighbourhood environment and sponsor new community services. A key strategy is to aquire land resources to provide equity so that the CDC can borrow on behalf of the community and make money available for new production ventures, housing renovation and other services. CDCs are also well suited to manage block grants from government to run local interests and services. There are many examples of successful CDCs in the United States[28] and also some in Canada.[29]

The fundamental result of a community regulated minimum throughput economy is that it inherently provides more jobs, more interesting jobs and more responsibility for production quality. As mentioned earlier this advantage of community scale technology is being successfully used by ITDG in the United Kingdom as an answer to the seemingly insoluble inflation/unemployment problem. Both community and government are beginning to see decentralised community economics as the solution. The ITDG strategy is to feed the seeds of community development with the small scale labour intensive technologies being developed at many UK universities and taught through the Open University (both also part of ITDG influence). Devon County Council are planning to produce their own unfired bricks, while an abandoned Yorkshire mill town has plans to develop a complete group of produce co-operatives.[30] Both large industries and large unions have surprisingly also helped worker owned co-operatives,

28. "Community Development Corporations" Center for Community Economic Development Cambridge, Mass., 1975.

29. Jeff Solway "Canadian Alternatives 1975 - A Movement Maturing, Secretary of State, May 1976, p. 127.

30. John Davis, loc. cit.

(5) the question of energy conservation should be dealt with as part of an overall community technology policy developed on the basis of its suitability to community needs. A policy which develops a minimum throughput community regulated economy will also lead to maximum energy conservation.

APPENDIX

LIST OF SOME REGIONAL AND NATIONAL U.S. ORGANIZATIONS INVOLVED IN COMMUNITY SELF-RELIANCE AND ALTERNATIVE ECONOMICS, TECHNOLOGY AND ENERGY ISSUES.

1. The Center for Community Economic Development (NATIONAL)
   639 Massachusetts Avenue, Cambridge, Mass., U.S.A.
   Tel: (617) 547-9695

2. The Institute for Local Self-Reliance (NATIONAL)
   1717 18th Street N.W., Washington D.C. 20009, U.S.A.
   Tel: (202) 232-4108 Newsletter: Self Reliance

3. The Center for Science in the Public Interest (NATIONAL)
   1757 'S' Street N.W., Washington D.C., 20009, U.S.A./Newsletter: People & Energy

4. The Institute for Policy Studies (NATIONAL/INTERNATIONAL)
   1901 'Q' Street N.W., Washington D.C., 20009, U.S.A.
   Newsletters: The Elements; Conference on Alternate State and Local Public Policies

5. The Movement for Economic Justice (NATIONAL)
   1611 Connecticut Avenue N.W., Washington D.C., 20009, U.S.A.
   Tel: (202) 462-4200 Newsletter: Just Economics

6. The Environmental Action Foundation (NATIONAL)
   1346 Connecticut Avenue N.W., Washington D.C., 20009, U.S.A.
   Tel: (202) 659-9682

7. Science for the People/SESPA (NATIONAL/INTERNATIONAL)
   897 Main Street, Cambridge, Mass., 02139, U.S.A.
   Newsletter: Science for the People

8. Vermont Tomorrow (REGIONAL)
   5 State Street, Montpelier, Vermont, 05602, U.S.A.
   Tel: (802) 223-6067

9. Organizers Book Center (NATIONAL)
   P.O. Box 21066, Washington D.C., 20009, U.S.A.

10. Safe Energy Coalition of New York (REGIONAL)
    P.O. Box 374, Catskill, New York, 12414, U.S.A.

11. ECOTYPE GROUP (REGIONAL)
    P.O. Box 615, Snohomish, WA., 98290, U.S.A.
    Tel: (206) 568-3510)

12. Alternative Energy Resources Organization (REGIONAL/NATIONAL)
    435 Stapleton Building, Billings, MT, 59101, U.S.A.
    Tel: (406) 259-1958 Newsletter: AERO Sun-Times

13. Energy Action (NATIONAL)
    1523 Elm St. N.W., Washington D.C., U.S.A.
    Tel: (202) 737-6220